

Case Report: A Boy with AKI

Presented by Prof Nagy Sayed-Ahmed

Presentation

- A previously healthy 14-year-old boy
- An episode of high fever (temperature, 104°F [40°C]), headache, nausea, and lumbar pain for several days.
- suspected encephalitis admitted to the hospital
- CSF testing and brain MRI normal

Initial laboratory findings

- CBC: hemoglobin 161 g/L, WBC $8 \times 10^9/\text{L}$, Platelet $108 \times 10^9/\text{L}$
- initial serum creatinine level of 0.75 mg/dL, CrCl calculated by Schwartz equation of 135 mL/min

Day 4

- Noticed decreased urine volume <400 ml/d for last 2 days despite fluid ttt
- serum creatinine level increased to 3.9 mg/dL
- LDH level was increased at 318 U/L
- platelet count decreased to $80 \times 10^9/L$
- AKI was diagnosed referred to the Nephrology Unit

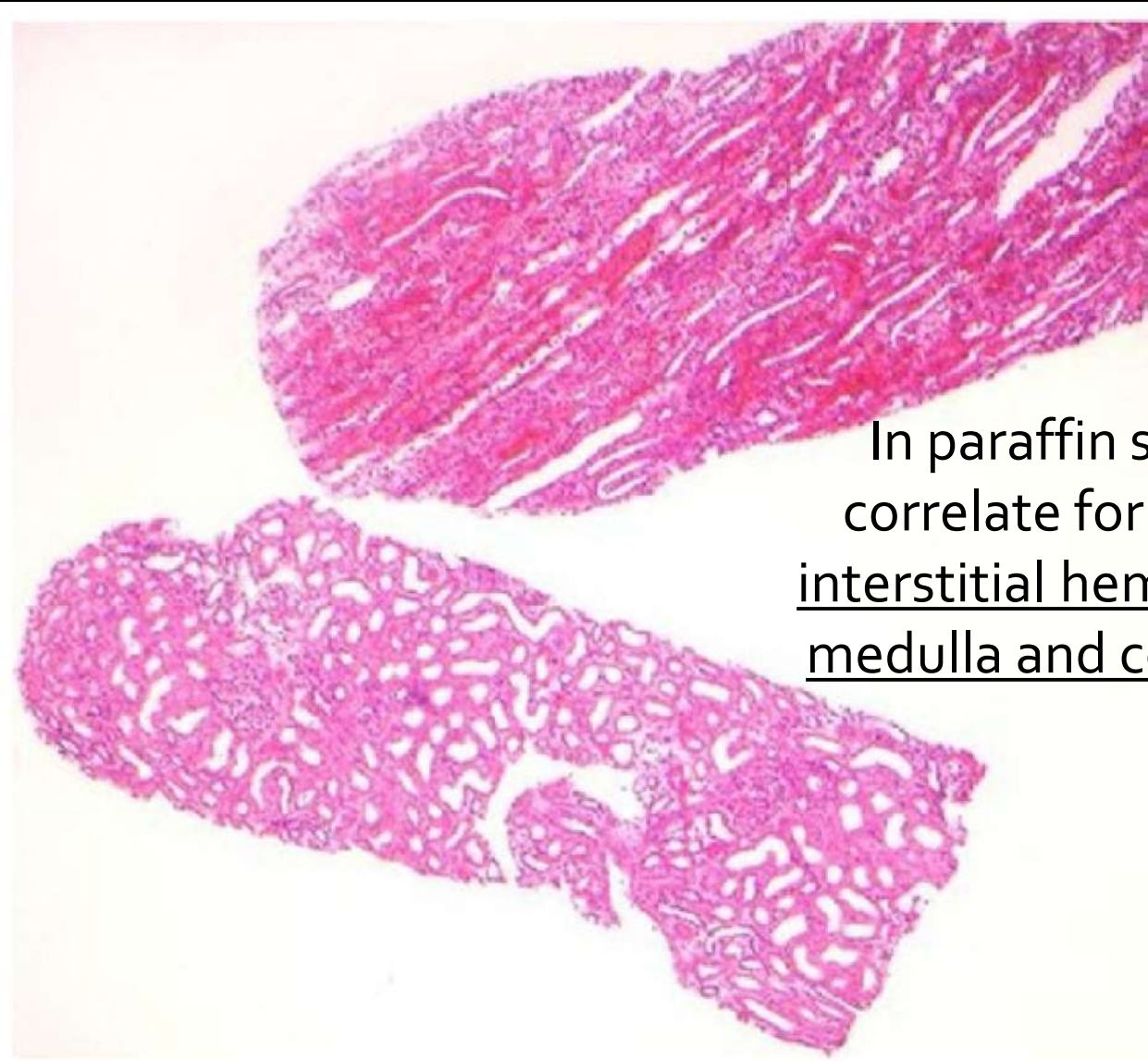
On arrival to Nephrology Unit Day 5

- Normotensive
- Afebrile
- Diffuse lumbar pain
- Other physical examination: normal
- CBC: hemoglobin 102 g/L, WBC $5.5 \times 10^9/\text{L}$, Platelet $88 \times 10^9/\text{L}$
- serum creatinine, 4.2 mg/dL, CrCl 24 mL/min
- Proteinuria 2 g/d, hematuria 2+, RBCs 40-50

Day 5 Kidney Ultrasound

- enlarged kidneys with a total kidney volume of 820 mL (reference value, 310 mL).
- A kidney biopsy was performed on day 5 after the onset of symptoms
- Results of kidney biopsy back on day 7

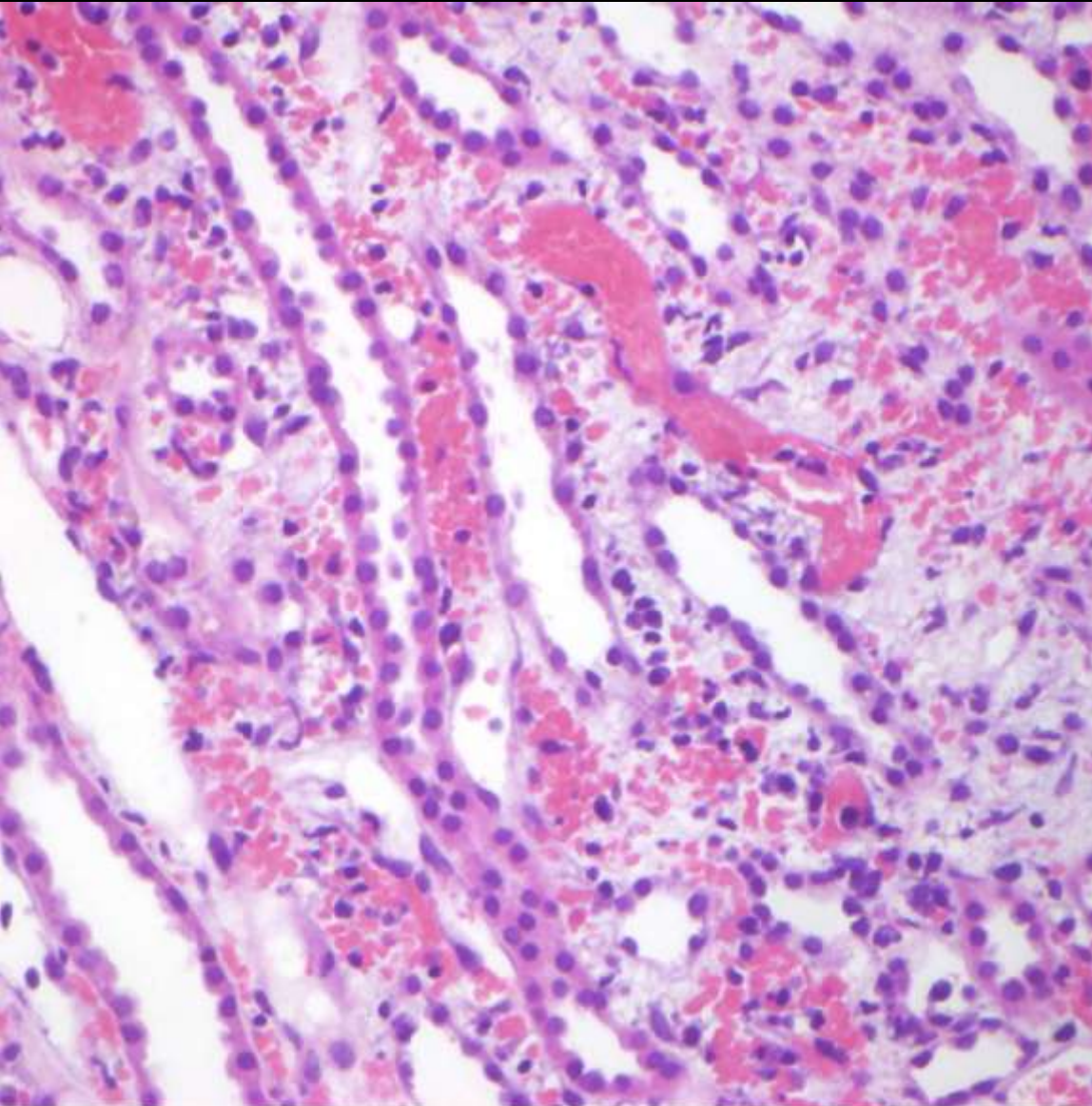
Kidney Biopsy – 1



On examination with a stereo microscope, a portion of the 2 biopsy cores was intensely red.

In paraffin sections, the microscopic correlate for this finding was massive interstitial hemorrhage confined to the medulla and corticomedullary junction

Kidney Biopsy – 2

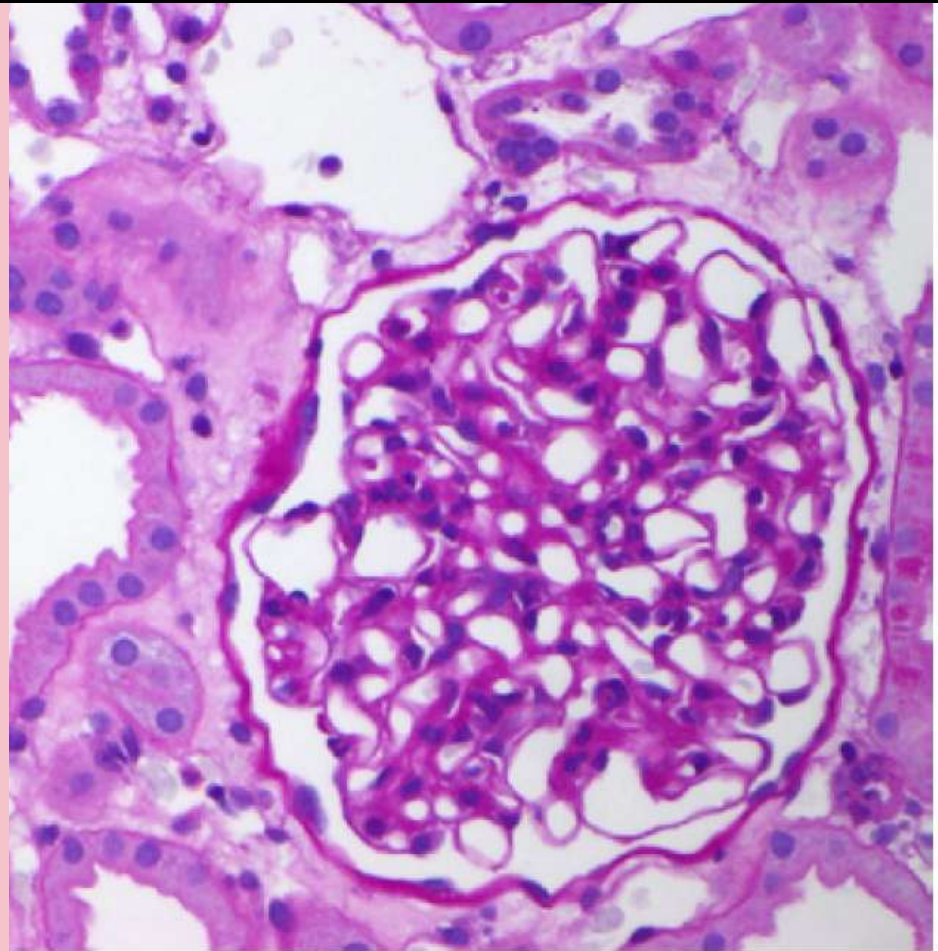


- Medulla with congested and ruptured capillaries, edema, interstitial hemorrhage, and moderate infiltrate of lymphocytes, plasma cells, neutrophils, and few eosinophils.
- Note the absence of intraepithelial infiltrates (H&E; X200)

Kidney Biopsy – 3

- Virtually normal glomerulus and preglomerular vessel.
- Cortical tubules with flattened epithelium and attenuated brush border indicating acute tubular damage.
- absence of hemorrhage and inflammatory infiltrates in this portion of the midcortex
- (PAS X 200)

Tubular basement membranes, surrounding interstitium, and glomeruli were normal



IHC & EM

- No immunoglobulin or complement deposits were found on immunohistochemical staining
- Ultrastructural examination did not show immune deposits or viral particles.
- Foot processes of the podocytes were well preserved, the endothelium in glomeruli and cortical peritubular capillaries was unremarkable

Diagnosis?



Diagnosis?

Causes of Hemorrhagic Interstitial Nephritis

- Infection
 - Hantavirus nephritis
 - Leptospirosis
 - Rickettsiosis
 - Other hemorrhagic fever RNA viruses
- Acute or hyperacute humoral rejection
- Hemorrhagic margin of anemic renal infarct
- Hemorrhagic renal infarct
- Injury from previous needle biopsy or other procedures

Other RNA viruses from the hemorrhagic fever group

- Marburg,
- Ebola,
- Dengue-fever virus, or
- flaviridae.

Diagnosis – 1

- Acute medullary hemorrhagic interstitial nephritis with acute tubular damage,
- Suggestive of

ACUTE HANTAVIRUS NEPHRITIS

- confirmed serologically by means of Western blot of the patient's serum against recombinant antigens of the Puumala serotype

Diagnosis – 2

- Further questioning showed that the patient lives in a rural area and frequently comes into contact with bank voles when cleaning mouse traps at his parents' house.
- He most likely caught the infection by inhalation of aerosolized hantavirus particles

Follow-ups

- Kidney function recovered fully within 10 days and kidney volume decreased to normal.
- 2 years after the infection, the patient remains well. He is normotensive and does not have renal sequelae, with a creatinine clearance of 140 mL/min

Clinical Teaching Point

- the combination of thrombocytopenia, fever, loin pain, and acute kidney injury in patients with potential contact with mice or other rodents (camping trips, living in rural areas, and so on) should alert physicians to the possibility of hemorrhagic fever with renal syndrome (HFRS) esp. hantavirus nephritis

Quoted from

- *Lordemann et al. American Journal of Kidney Diseases, Vol 54, No 6 (December), 2009: pp 1162-1166*
 - *Hannover Medical School, Hannover, Germany*

THANK
YOU